

CLAIMS

1. A computer-implemented method of providing a volumetric representation of a three-dimensional object, the method comprising:

5 obtaining a line list of points of at least one set of lines having start and end points corresponding to intersection of the lines with object boundary positions;

10 obtaining an approximate volumetric representation of the object; and producing a modified volumetric representation by modifying the approximate volumetric representation based on the start and end points of the set of lines and the approximate volumetric representation.

15 2. The method of claim 1 wherein at least two two-dimensional images of the object are obtained and the object boundary positions are defined by edges of the object in the at least two two-dimensional images.

20 3. The method of claim 2 wherein the at least one set of lines is projected into at least one of the images to determine which of the lines intersect the edges.

25 4. The method of claim 3 wherein the line list of points is determined by the points where the lines intersect the edges.

25 5. The method of claim 4 wherein the set of points are start and end points of line segments of the lines that intersect the edges.

30 6. The method of claim 2 wherein the approximate volumetric representation is obtained by projecting the at least two images of the object into an array of voxels, determining in which of the voxel(s) one or more of the edge(s) of the object intersects therewith, and producing a voxel list thereof.

7. The method of claim 6 wherein the line list(s) are used to determine at least some locations on voxel edges of respective voxels in the voxel list to

produce a voxel edge intersection list, and wherein the voxel edge intersection list is used to produce the modified volumetric representation.

8. The method of claim 6 when appended to claim 5 wherein the start
5 and end points of the line segments are used to determine at least some locations on voxel edges of respective voxels in the voxel list to produce a voxel edge intersection list, and wherein the voxel edge intersection list is used to produce the modified volumetric representation.

10 9. The method of claim 1 wherein the modified volumetric representation is produced to have at least some voxel edges which more accurately match object edges than in the approximate representation.

15 10. The method of claim 1 wherein the approximate volumetric representation is obtained using a marching cubes procedure.

11. The method of claim 10 wherein the start and end points are used to modify the spatial positions of triangle vertices of triangles produced by the marching cubes procedure on the triangle vertices' respective voxel edges.

20 12. The method of claim 2 wherein the images are produced from a chroma-key process.

13. The method of claim 12 wherein the initial images are obtained
25 using one or more cameras in a studio, which studio may include a retroreflective background behind the object.

14. The method of claim 5 wherein the start and end points and the position and direction of the lines are estimated with respect to a position of a
30 camera when obtaining the images.

15. The method of claim 5 including receiving and/or storing and/or dynamically obtaining a plurality of measures of camera positions.

16. The method of claim 12 including three pairs of images, wherein the images of each pair lie in a parallel plane, and the plane of each respective image of each pair is normal to the planes of the remaining pairs.

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17. The method of claim 1 wherein a texture map is applied to the volumetric representation.

18. A computer-implemented method for providing a moving volumetric representation of an object, the method comprising obtaining a plurality of volumetric representations of a three-dimensional object using the method of claim 1, where each volumetric representation represents a different phase of movement of the object over time, and consecutively displaying each volumetric representation in a manner to produce to a viewer the sensation that the volumetric representation of the object is moving.

19. A system for providing a volumetric representation of a three dimensional object, the system comprising:
means for obtaining an approximate volumetric representation of the object;
means for obtaining a line list of points of at least one set of lines having start and end points corresponding to intersection of the lines with object boundary positions;
means for storing the line list of points; and
means for producing a modified volumetric representation based on the start and end points of the set of lines.

20. The system of claim 19 including means for obtaining at least two two-dimensional images of the object and the object boundary positions are defined by edges of the object in the at least two two-dimensional images.

21. The system of claim 20 including means for projecting the at least one set of lines into at least one of the images to determine which of the lines intersect the edges.

5 22. The system of claim 20 wherein the means for obtaining is at least one camera.

23. The system of claim 22 comprising means for receiving and/or storing a plurality of measures of positions of the at least one camera.

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24. A method of providing a volumetric representation of a three-dimensional object, the method comprising:

obtaining a line list of points of at least one set of lines having start and end points corresponding to intersection of the lines with object

15 boundary positions; and

producing the volumetric representation by correlating the start and end points of the set of lines to produce a continuous representation of the object.

25. The method of claim 24 wherein correlating the start and end 20 points comprises searching for neighbouring points.

26. The method of claim 25 wherein sets of at least three neighbouring points are correlated to form sets of polygons.

25 27. The method of claim 24 wherein lines are arranged over at least one two-dimensional grid and at least some points are correlated by performing a two-dimensional search for neighbouring points over the at least one two-dimensional grid.

30 28. A computer program stored on a computer readable medium, for providing a volumetric representation of a 3D object, comprising instructions for obtaining a line list of points of at least one set of lines having start and end points corresponding to intersection of the lines with object boundary positions;

obtaining an approximate volumetric representation of the object; and producing a modified volumetric representation by modifying the approximate volumetric representation based on the start and end points of the set of lines and the approximate volumetric representation.

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29. The computer program of claim 28 further comprising instructions for providing a plurality of further volumetric representations of 3D object, each volumetric representation representing a different phase of movement of the object over time, and consecutively displaying each volumetric representation in 10 a manner to produce to a viewer the sensation that the volumetric representation of the object is moving.